

REMARKS

Status of the claims

Claims 1-10 and 12 are pending in this application, the independent claims being claims 1, 3 and 12. By this Amendment, claims 1 and 3 are amended and claim 12 is newly presented. Claim 11 previously was cancelled.

Summary of the Official Action

In the Official Action, claims 1-10 were rejected under 35 U.S.C. 112, second paragraph, as indefinite, and claims 1-10 further were rejected under 35 U.S.C. 103(a), as unpatentable over Japanese Patent Publication 2001-305552 (Shuichi) in view of U.S. Patent No. 6,166,848 (Cammenga).

Reconsideration and withdrawal of the rejections respectfully are requested in view of the above amendments and the following remarks.

Examiner Telephone Interview(s)

Applicants' attorney acknowledges the courtesies extended to him by the Examiner in several telephone communications on or about July 18-20, 2000. In a first telephone communication, the Examiner stated that the prior-filed Amendment canceling claim 11 had been entered, that claim 3 was allowed, but that his prior indication that claims 1, 2 and 4-10 were allowed now was withdrawn; the Examiner requested that claims 1, 2 and 4-10 be canceled to place the application in condition for allowance. Upon further discussion, the Examiner stated that he objected to the language in claim 1 of "a sectional curvature surface with no acute angles" as indefinite. Applicants' attorney directed the Examiner's attention to paragraph [0022] and Figs. 4 and 9 of the present application, and to the JP 2001-30552 reference cited in paragraph [0022], as support for this feature. Applicants' attorney also noted the similar language in claim 3. In a second telephone communication, the Examiner stated that claim 3 also was not allowable for the same reasons. Applicants' attorney again

directed the Examiner's attention to Figs. 4 and 9, the disclosure at paragraph [0022] and the definition of "acute angle", as illustrated and described in the JP '552 reference. In a third telephone communication, the Examiner proposed amending each of claims 1 and 3 by Examiner's Amendment to recite an "elliptical shaped section" to obviate any formal objections and place the claims in condition for allowance. Applicants' attorney maintained that the claim language was definite and that the claims were in condition for allowance, and further stated that he would require authorization from the client to agree to such an Examiners' amendment. The Examiner stated that he was required to take further action that day and therefore would issue a further action.

Claim Amendments

The formal rejection and the rejection of claims 1-10 over the cited art respectfully are traversed. Nevertheless, without conceding the propriety of the rejections, and solely to advance prosecution of the present application to issue, claims 1 and 3 have been amended to recite more clearly various novel features of the claimed invention, and newly presented claim 12 has been added to provide Applicants with an additional scope of protection commensurate with the disclosure. Support for the amendments to claims 1 and 3 may be found in the original application, e.g., in Figs. 4 and 9 and the written disclosure at paragraphs [0020]-[0022]. Newly presented claim 12 re-presents the subject matter of original claim 11, which previously was canceled solely to place the application in condition for allowance based on the Examiner's prior determination of allowable subject matter in this application. Support for the features of claim 12 may be found in the original application, e.g., in Fig. 11(a) and in the written disclosure at paragraphs [0070] and [0094]. No new matter has been added.

Claimed Invention

The present invention relates to a novel electro-optical device. In one aspect, as recited in claim 1, the claimed invention relates to an electro-optical device comprising an electro-optical substance, a pair of substrates holding the electro-optical substance, and pole-like spacers provided on at least one substrate of the pair of substrates, on a to-be-provided surface of the at least one substrate facing the electro-optical substance. Each pole-like spacer has an elongated sectional shape including a rounded initial contact surface and separation contact surface in a direction of elongation, and at roots thereof, a slope portion with a surface connecting to the to-be-provided surface of the at least one substrate.

In another aspect, as recited in independent claim 3, the claimed invention relates to an electro-optical device comprising an electro-optical substance, a pair of substrates holding the electro-optical substance, pole-like spacers provided on at least one substrate of the pair of substrates, on a to-be-provided surface of the at least one substrate facing the electro-optical substance, and an orientation film formed on the to-be-provided surface of the at least one substrate. Each pole-like spacer has an elliptic-shaped cross-section including a rounded initial contact surface and separation surface in a direction of a major axis of the elliptic-shaped cross-section, and at roots thereof, a slope portion with a surface connecting to the to-be-provided surface of the at least one substrate, where the orientation film is rubbed in the direction of the major axis of the elliptic-shaped cross-section.

In another aspect, as recited in independent claim 12, the claimed invention relates to an electro-optical device comprising a TFT array substrate, a counter substrate, pixel electrodes formed on the TFT array substrate, a counter electrode formed on the counter substrate, an electro-optical substance held between the TFT array substrate and the counter substrate, and a light-shielding film formed between the counter substrate and the counter

electrode, where the light-shielding film forms pole-like spacers that are arranged along gaps among the pixel electrodes.

Prior Art Distinguished

Applicants submit that the prior art fails to anticipate the claimed invention. Moreover, Applicants submit that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The Shuichi JP '552 reference relates to a liquid crystal device and its manufacturing method, and discloses a liquid crystal device including pillar-shaped spacers. However, Applicants submit that the Shuichi JP '552 reference fails to disclose or suggest at least the above-discussed features of the claimed invention. Initially, as acknowledged by the Examiner, the Shuichi JP '552 reference fails to disclose or suggest the feature of a pole-like spacer having, at roots thereof, a slope portion with a surface connecting to the to-be-provided surface. The Shuichi JP '552 reference illustrates in Fig. 10 and describes in the corresponding text at paragraph [0062] various pillar-shaped spacers including at least a leading contact surface having an acute- (e.g., sharp-) angled point of contact. Nowhere does the Shuichi JP '552 reference disclose or suggest a pole-like spacer having an elongated sectional shape or an elliptic-shaped cross-section including a rounded initial contact surface and separation surface in a direction of elongation (e.g., the direction of the major axis of the elliptic-shaped cross-section), as disclosed in the present application and recited in independent claims 1 and 3.

The Cammenga '848 patent relates to an electrochromic rearview mirror incorporating a third surface metal reflector and a display signal light, and was cited for its disclosure of pole-like spacers having, at roots thereof, a slope portion with a surface connecting to the to-be-provided surface. Without conceding the propriety of the Examiner's

characterization of the art, Applicants submit that the Cammenga '848 patent fails to illustrate in Fig. 6 or otherwise disclose or suggest at least the above-discussed combination of features of the claimed invention. Nowhere does the Cammenga '848 patent disclose or suggest at least the feature of a pole-like spacer having an elongated sectional shape, or an elliptic-shaped cross-section, including a rounded initial contact surface and separation surface in a direction of elongation (e.g., the direction of the major axis of the elliptic-shaped cross-section), as disclosed in the present application and recited in independent claims 1 and 3. Nor is the Cammenga '848 patent believed to add anything to the Shuichi JP '552 reference that would make obvious the claimed invention.

Applicants have reviewed the art of record and submit that the prior art fails to disclose or suggest the features of an electro-optical device comprising a TFT array substrate, a counter substrate, pixel electrodes formed on the TFT array substrate, a counter electrode formed on the counter substrate, an electro-optical substance held between the TFT array substrate and the counter substrate, and a light-shielding film formed between the counter substrate and the counter electrode, where the light-shielding film forms pole-like spacers that are arranged along gaps among the pixel electrodes, as disclosed in the present application and recited in independent claim 12.

For the above reasons, Applicants submit that claims 1, 3 and 12 are allowable over the cited art.

Claims 2 and 4-10 depend from claims 1 and 3, respectively, and are believed allowable for the same reasons. Moreover, each of these dependent claims recites additional features in combination with the features of its respective base claim and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

Conclusion

Applicants believe the present Amendment is responsive to each of the points raised by the Examiner in the Official Action, and submit that the Application is in condition for allowance. Favorable consideration of the claims and passage to issue of the present application at the Examiner's earliest convenience earnestly are solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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